Product Preview

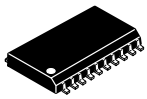
Phase-Frequency Detector

MC100LVEL40

The MC100LVEL40 is a phase/frequency detector intended for phase–locked loop applications which require a minimum amount of phase and frequency difference at lock. The device is a basic three state phase detector with differential inputs and outputs. The device is designed to work from either a 3.3V or 5.0V power supply.

When the reference (R) and the feedback (FB) inputs are unequal in frequency and/or phase the differential up (U) and down (D) outputs will provide pulse streams which when subtracted and integrated provide an error voltage for control of a VCO.

- 250MHz Typical Bandwidth
- Small Outline 20–Lead SOIC Packaging
- >2000V ESD Protection



DW SUFFIX
20–LEAD PLASTIC SOIC WIDE PACKAGE
CASE 751D–04

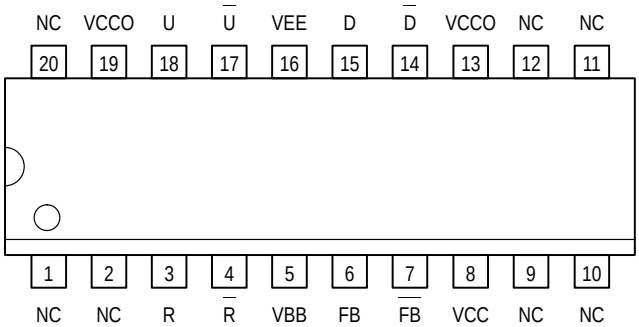


Figure 1. 20–Lead Pinout (Top View)

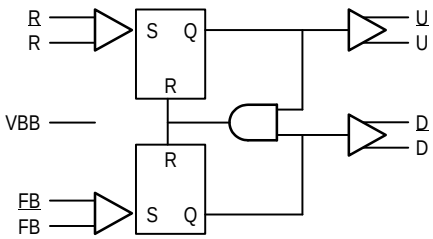


Figure 2. Logic Diagram

3.3V ECL DC CHARACTERISTICS (T_A = –40°C to 85°C; V_{EE} = –3.0V to –3.8V; V_{CC} = GND)

		–40°C			0°C to +85°C			
Symbol	**Parameter**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**
V_{OH}	Output HIGH Voltage	–1085	–1005	–880	–1025	–955	–880	V
V_{OL}	Output LOW Voltage	–1830	–1695	–1555	–1810	–1705	–1620	V
V_{IH}	Input HIGH Voltage	–1165		–880	–1165		–880	V
V_{IL}	Input LOW Voltage	–1810		–1475	–1810		–1475	V
I_{IL}	Input LOW Current	0.5			0.5			μA
I_{EE}	Power Supply Current		45			45		mA

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

PECL DC CHARACTERISTICS (T_A = –40°C to 85°C; V_{CC} = V_{CC}(min) to V_{CC}(max); V_{EE} = GND)

Symbol	Characteristic	–40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1]	2.215	2.295	2.420	2.275	2.345	2.420	2.275	2.345	2.420	2.275	2.345	2.420	V
V_{OL}	Output LOW Voltage[1]	1.470	1.605	1.745	1.490	1.595	1.680	1.490	1.595	1.680	1.490	1.595	1.680	V
V_{IH}	Input HIGH Voltage[1]	2.135		2.420	2.135		2.420	2.135		2.420	2.135		2.420	V
V_{IL}	Input LOW Voltage[1]	1.490		1.825	1.490		1.825	1.490		1.825	1.490		1.825	V
V_{BB}	Output Reference Voltage[1]	1.92		2.04	1.92		2.04	1.92		2.04	1.92		2.04	V
V_{CC}	Power Supply Voltage	3.0		3.8	3.0		3.8	3.0		3.8	3.0		3.8	V
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current R, $\overline{FB}$	–300			–300			–300			–300			µA
	Input LOW Current Others	0.5			0.5			0.5			0.5			
I_{EE}	Power Supply Current		45			45			45			45		mA

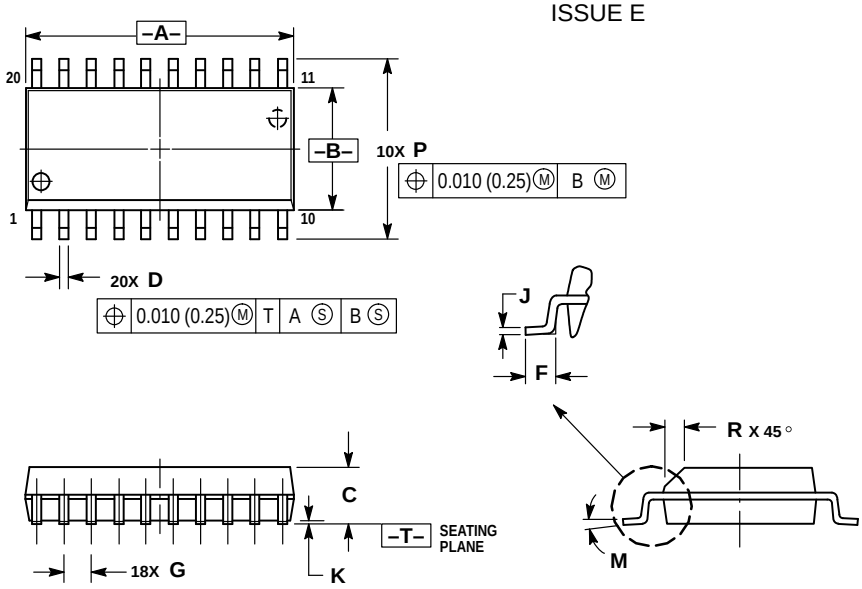
1. These values are for V_{CC} = 3.3V. Level Specifications will vary 1:1 with V_{CC}.

AC Characteristics (T_A = –40°C to 85°C)

Symbol	Parameter		Min	Typ	Max	Unit
f_{max}	Maximum Toggle Frequency			250		MHz
t_{PLH}, t_{PHL}	Propagation Delay	R to D		1100		ps
		R to U		450		
		FB to D		450		
		FB to U		1100		
t_r/t_f	Output Rise/Fall Time			350		ps

OUTLINE DIMENSIONS

DW SUFFIX
PLASTIC SOIC WIDE PACKAGE
CASE 751D–04
ISSUE E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	12.65	12.95	0.499	0.510
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.50	0.90	0.020	0.035
G	1.27 BSC		0.050 BSC	
J	0.25	0.32	0.010	0.012
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029

How to reach us:
USA / EUROPE / Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602–244–6609
– US & Canada ONLY 1–800–774–1848

INTERNET: http://motorola.com/sps

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 4–32–1,
Nishi–Gotanda, Shinagawa–ku, Tokyo 141, Japan. 81–3–5487–8488

ASIA / PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298